Space Weather Forecast

Issued on Sunday, 31 March 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely (R1-R2 Blackouts) with slight chance of Strong flares (R3 Blackouts) but risk decreases through Day 2 (01 Apr). Chance of G1 Minor Geomagnetic storm intervals later in the period given expected fast solar wind influence.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate with one long duration Moderate-class flare peaking at 30/2116 UTC from the large region that currently rotating around over the southwest limb. There are four active regions currently on the visible disc. The group now rotated beyond the western limb remains the largest and most complex region though with only the far trailing portion still visible. All other regions remain generally small and or simple, with much of the visible disk devoid of activity.

There have been a number of Coronal Mass Ejections (CMEs) observed in coronagraph imagery over the past 24 hours, none of which were analysed to be Earth-directed.

Solar Wind / Geomagnetic Activity: The solar wind started the period at slow-ambient levels (around 330 km/s), before increasing from around 30/1300 UTC. Wind speeds showed a steeper increase from 30/1729 UTC becoming Slightly Elevated at 30/1847 UTC and are currently at Elevated levels around 510 km/s. The Interplanetary Magnetic Field (IMF) initially on an increasing trend, rising to a moderate peak at 30/2039 UTC before values plateaued at generally weak levels. The important north-south component, fluctuated moderately but largely remained positive. Geomagnetic activity was Quiet to Active (Kp 1-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background and well below Radiation Storm levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity at first, with a slight chance of an isolated Strong flare from the large sunspot region that lies on the southwest limb. This region is expected to depart the disc later Day 1 (31 Mar) with flare risks reducing significantly. However, any notable Strong flares may remain observable into Days 2-3 (01-02 Apr). Activity is then expected to be Low.

Solar Wind / Geomagnetic Activity: There are no Earth-directed Coronal Mass Ejections (CMEs) currently forecast during the period. Solar wind are exhibiting signs of enhancement due to the arrival of a stream of faster solar winds. Winds are expected to remain at Slightly Elevated levels Days 1-2 (31 Mar-01 Apr), perhaps peaking at Elevated levels before easing into early Day 3 (02 Apr). The arrival of further fast winds is expected later Day 3 (02 Apr) or into Day 4 (03 Apr), with speeds likely to return to Elevated levels with an increased chance of geomagnetic response.

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Geomagnetic activity is expected to be mainly Quiet to Unsettled (Kp 2-3) but with a chance of Active intervals Day 1 (31 Mar). Activity expected to increase from later Day 3 (02 Apr) into Day 4 (03 Apr), with Unsettled to Active conditions expected and an increased chance of G1 Minor Storm intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to be near background levels, with a slight chance of enhancement above the S1/Minor Radiation storm level given any notable flares from the large sunspot rotating round the southwest limb. This risk lowers significantly by Day 3 (02 Apr).

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	25	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	20	5	15
Very Active	R3 to R5 X	No	15	5	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	5	1
Very Active	≥ S3 *	No	5	5	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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